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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/814,160	03/22/2001	Dimitris K. Agraftis	1503.0870001	2782
26111	7590	05/24/2004	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			NGUYEN BA, HOANG VU A	
		ART UNIT		PAPER NUMBER
		2122		
DATE MAILED: 05/24/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/814,160	AGRAFIOTIS ET AL.	
Examiner	Art Unit		
Hoang-Vu A Nguyen-Ba	2122		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### **Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 22 March 2001.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-14 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5)  Claim(s) \_\_\_\_\_ is/are allowed.  
6)  Claim(s) 1-14 is/are rejected.  
7)  Claim(s) \_\_\_\_\_ is/are objected to.  
8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on 22 March 2001 is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5.

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.

5)  Notice of Informal Patent Application (PTO-152)

6)  Other: \_\_\_\_.

### **DETAILED ACTION**

1. This action is responsive to the application filed March 22, 2001 claiming priority benefit of provisional application no. 60/191,108 filed March 22, 2000.
2. Claims 1-14 have been examined.

#### *Drawings*

3. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Furthermore, Figure 2 is missing.

#### *Claim Objections*

4. Claims 1, 7, 8 and 14 are objected to because of the following informalities:

**Claims 1 and 8:** if these claims recite only two limitations, a conjunction – and – should be added to the end of the first limitation.

**Claims 7 (line 8) and 14 (line 9):** the comma “,” before “and” should be replaced with a semi-colon – ; –

Appropriate correction is required.

#### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-14 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1 and 8 recite “a set of  $n$ -dimensional input patterns” and “an  $m$ -dimensional output space.” It is unclear what are the metes and bounds of the variables  $n$  and  $m$ . Are  $n$  and  $m$  integers from a set of integer numbers from 0 to infinity?

Claims 2-7 and 9-14, which depend from claims 1 and 8 respectively, are also rejected for the same reason.

7. Claims 2 (line 2) and 9 (line 4) recite the limitation “the set of input patterns”. There is insufficient antecedent basis for this limitation in the claim. For art rejection purposes, the above limitation is interpreted to mean – the set of  $n$ -dimensional input patterns –

Claims 2 (line 13), 5 (line 13), 9 (line 14) and 12 (line 15) recite the limitation “the respective pattern subsets  $G_i$ ”. There is insufficient antecedent basis for this limitation in the claim.

Claims 4 (line 5), 7 (line 10), 11 (line 7), 14 (line 9) recite the limitation “the reference point  $c_j$ ”. There is insufficient antecedent basis for this limitation in the claim.

Claims 10 and 13 recite the limitation “said computer readable program code means”. There is insufficient antecedent basis (e.g., first or second?) for this limitation in the claim.

#### *Claim Rejections – 35 USC § 101*

8. 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 2, 4-5, 7 and 9, 11-12, 14 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

The claims are not limited to “a practical application of an abstract idea which produced a useful, concrete, and tangible result.” State Street Bank & Trust v. Signature Financial Group, Inc., 149 F. 3d 1368, 1375 n. 9 (Fed. Cir. 1998).

Specifically, the claims are directed to an algorithm comprising a series of steps that are based on formula with variables, the range of which not clearly defined. These algorithm and mathematical formula are abstract ideas which do not produce useful, concrete, and tangible results under the State Street Formulation.

On this basis, claims 2, 4-5, 7 and 9, 11-12, 14 are rejected under 35 U.S.C. § 101.

#### *Claim Rejections – 35 U.S.C. § 102*

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,734,796 to Pao.

### Claims 1 and 8

Pao discloses at least:

- (a) *creating a set of locally defined neural networks trained according to a mapping of a subset of the n-dimensional input patterns into an m-dimensional output space (see at least Figure 1b and related discussion in the specification); and*
- (b) *mapping additional m-dimensional input patterns using the locally defined neural networks (see at least Figure 1b and related discussion in the specification).*

### Claims 2 and 9

The rejection of base claims 1 and 8, respectively is incorporated. Pao further discloses:

- (i) *selecting k patterns from the set of input patterns, (x<sub>i</sub>, i = 1, 2, ..., k, x ∈ R<sup>n</sup>) (see at least Figure 1b and related discussion in the specification);*
- (ii) *mapping the patterns {x<sub>i</sub>} into an m-dimensional space (x<sub>i</sub> → y<sub>i</sub>, i = 1, 2, ..., k, y<sub>i</sub> ∈ R<sup>m</sup>), to form a training set T = {(x<sub>i</sub>, y<sub>i</sub>), i = 1, 2, ..., k} (see at least Figure 1b and related discussion in the specification);*
- (iii) *determining c n-dimensional reference points, {c<sub>i</sub>, i = 1, 2, ..., c, c ∈ R<sup>n</sup>} (see at least Figure 1b and related discussion in the specification);*
- (iv) *partitioning T into c disjoint clusters C<sub>j</sub> based on a distance function d, (C<sub>j</sub> = {((x<sub>i</sub>, y<sub>i</sub>): d(x<sub>i</sub>, c<sub>j</sub>) <= d(x<sub>i</sub>, c<sub>k</sub>) for all k ≠ j; j = 1, 2, ..., c, i = 1, 2, ..., k}) (see at least Figure 1b and related discussion in the specification);*
- (v) *training c independent local networks {Net<sub>i</sub><sup>L</sup>, i = 1, 2, ..., c}, with the respective pattern subsets C<sub>i</sub> (see at least Figure 1b and related discussion in the specification).*

### **Claims 3 and 10**

The rejection of base claims 1 and 8 and intervening claims 2 and 9, respectively are incorporated. Pao further discloses *wherein said step (iii) is performed using a clustering methodology* (see at least 1:31-43).

### **Claims 4 and 11**

The rejection of base claims 1 and 8 and intervening claims 2 and 9, respectively are incorporated. Pao further discloses:

- (i) *for an additional n-dimensional input pattern  $x \in R^n$ , determining the distance to each reference point in  $\{c_i\}$  see at least Figure 1b and related discussion in the specification);*
- (ii) *identifying the reference point  $c_j$  closest to the input pattern  $x$  (see at least Figure 1b and related discussion in the specification); and*
- (iii) *mapping  $x \rightarrow y, y \in R^m$ , using the local neural network  $Net_j^L$  associated with the reference point  $c_j$  identified in step (ii) (see at least Figure 1b and related discussion in the specification).*

### **Claims 5 and 12**

The rejection of base claims 1 and 8 is incorporated. Pao further discloses *wherein step (a) comprises the steps of:*

- (i) *selecting  $k$  patterns of the set of n-dimensional input patterns,  $\{x_i, i=1, 2, \dots, k, x_i \in R^n\}$  (see at least Figure 1b and related discussion in the specification);*
- (ii) *mapping the patterns  $(x_i)$  into an m-dimensional space  $(x_i \rightarrow y_i, i = 1, 2, \dots, k, y_i \in R^m)$ , to form a training set  $T = \{(x_i, y_i), i = 1, 2, \dots, k\}$  (see at least Figure 1b and related discussion in the specification);*

(iii) determining  $c$   $m$ -dimensional reference points,  $\{c_i, i = 1, 2 \dots c, c_i \in R^m\}$  (see at least Figure 1b and related discussion in the specification);

(iv) partitioning  $T$  into  $c$  disjoint clusters  $C_j$  based on a distance function  $d$ ,  
( $C_j = \{(x, y) : d(y, c_j) \leq d(y, c_k) \text{ for all } k \neq j; j = 1, 2 \dots c, i=1,2, \dots k\}$ ) (see at least Figure 1b and related discussion in the specification);

(v) training  $c$  independent local networks  $\{Net_i^L, i = 1, 2, \dots c\}$ , with the respective pattern subsets  $C_i$  (see at least Figure 1b and related discussion in the specification); and

(vi) training a global network  $Net^G$  using all the patterns in  $T$  (see at least Figure 1b and related discussion in the specification).

### Claims 6 and 13

The rejection of base claims 1 and 8 and intervening claims 5 and 12 are incorporated. Pao further discloses *wherein said step (iii) is performed using a clustering methodology* (see at least 1:31-43).

### Claims 7 and 14

The rejection of base claims 1 and 8 and intervening claims 5 and 12 are incorporated. Since claims 7 and 14 recite the same limitations of claims 4 and 11, respectively, the same rejections are therefore applied.

### Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Antony Nguyen-Ba, whose telephone number is (703) 305-0103. The examiner can normally be reached on Tuesday - Friday from 6:15 – 3:45 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam, can be reached at (703) 305-4552.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Central Fax Number

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ANTONY NGUYEN-BA  
PRIMARY EXAMINER

Art Unit 2122

May 14, 2004